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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/643,817	08/18/2003	Frank Chethik	040092-023400US	5164
31824	7590	01/11/2005	EXAMINER	
MCDERMOTT WILL & EMERY LLP 18191 VON KARMAN AVE. IRVINE, CA 92612-7107			CHEN, SHIH CHAO	
			ART UNIT	PAPER NUMBER
			2821	

DATE MAILED: 01/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/643,817	Applicant(s) CHETHIK ET AL.	
	Examiner Shih-Chao Chen	Art Unit 2821	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 August 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the step-cylinder horn antenna elements, dipole antenna elements, helical antenna elements and slot antenna elements in claims 3 and 21; and the parabolic convex shape, the parabolic concave shape, the ellipsoidal convex shape, the ellipsoidal concave shape, the saddle shape, or the airfoil shape in claims 7 and 25 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will

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be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-35 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 1-2 and 19-20, the phrase "can be" renders the claim(s) indefinite

because the claim(s) include(s) elements not actually disclosed (those encompassed by "can be"), thereby rendering the scope of the claim(s) unascertainable.

Claims 3 and 21 recite the limitation "the horn elements" in lines 1-2 or 1. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-13 and 19-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Rao et al. (EP 1003241 A1).

Regarding claim 1, Rao et al. teaches in figures 1-15 an antenna array system, comprising: a plurality of antenna elements [42] organized in an array and configured to form a non-planar shaped antenna array surface (44); and switching circuitry [36] configured to switch each of the plurality of antenna elements on or off based on control signals; wherein the antenna beam direction can be steered in a first direction by switching on a first set of antenna elements, and wherein the antenna beam direction can be steered in a second direction by switching on a second set of antenna elements (See FIG. 1-3).

Regarding claim 2, Rao et al. teaches in figures 1-15 the antenna array system as recited in claim 1, wherein the antenna beam direction can be steered in a plurality of directions by switching on a set of antenna elements for each of the plurality of directions (See FIG. 1-3).

Regarding claim 3, Rao et al. teaches in figures 1-15 the antenna array system as recited in claim 1, wherein the horn elements [42] are selected from the group consisting of cylindrical horn antenna elements, conical horn antenna elements..

Regarding claim 4, Rao et al. teaches in figures 1-15 the antenna array system as recited in claim 1, wherein the antenna elements [42] are symmetrically located within the antenna array [34].

Regarding claim 5, Rao et al. teaches in figures 1-15 the antenna array system as recited in claim 1, wherein the antenna elements [42] evenly spaced within the antenna array [34].

Regarding claim 6, Rao et al. teaches in figures 1-15 the antenna array system as recited in claim 1, wherein the antenna elements [42] are the same size.

Regarding claim 7, Rao et al. teaches in figures 1-15 the antenna array system as recited in claim 1, wherein the non-planar shaped antenna array surface [44] comprises a non-planar shape selected from the group consisting of a parabolic concave shape.

Regarding claim 8, Rao et al. teaches in figures 1-15 the antenna array system as recited in claim 1, wherein the antenna array [34] is a transmit antenna array, a receive antenna array, or a transmit and receive antenna array.

Regarding claim 9, Rao et al. teaches in figures 1-15 the antenna array system as recited in claim 1, wherein the antenna array [34] comprises M-number of antenna elements [42], and wherein the switching circuitry [36] is configured to control N-number of the M-number of antenna elements [42] at a given time, the switching circuit comprising: a signal splitter [48] adapted to split a signal into N-number of signals; a switching matrix [47] comprising NxM-number of switches [S]; and switch control circuitry adapted to control the switching matrix so that a specified set of the N-number of the M-number of antenna elements are switched on.

Regarding claim 10, Rao et al. teaches in figures 1-15 the antenna array system as recited in claim 9, wherein the switching matrix [47] comprises MEMS switches.

Regarding claim 11, Rao et al. teaches in figures 1-15 the antenna array system as recited in claim 9, wherein the switching circuit [36] further comprises a signal

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amplifier [49] adapted to amplify the signal prior to the signal entering the signal splitter [48].

Regarding claim 12, Rao et al. teaches in figures 1-15 the antenna array system as recited in claim 9, wherein the switching circuit [36] further comprises a filter/diplexer [46] adapted to separate transmit and receive signals to/from the antenna array [34].

Regarding claim 13, Rao et al. teaches in figures 1-15 the antenna array system as recited in claim 1, wherein the antenna array system [30] is adapted for use on space vehicles.

Regarding claim 19, Rao et al. teaches in figures 1-15 a spacecraft [12], comprising: an antenna array system [30], comprising: a plurality of antenna elements [42] organized in an array and configured to form a non-planar shaped antenna array surface [44]; and switching circuitry [36] configured to switch each of the plurality of antenna elements on or off based on control signals; wherein the antenna beam direction can be steered in a first direction by switching on a first set of antenna elements [42], and wherein the antenna beam direction can be steered in a second direction by switching on a second set of antenna elements [42].

Regarding claim 20, Rao et al. teaches in figures 1-15 the spacecraft as recited in claim 19, wherein the antenna beam direction can be steered in a plurality of directions by switching on a set of antenna elements for each of the plurality of directions.

Regarding claim 21, Rao et al. teaches in figures 1-15 the spacecraft as recited in claim 19, wherein the horn elements [42] are selected from the group consisting of cylindrical horn antenna elements, conical horn antenna elements.

Regarding claim 22, Rao et al. teaches in figures 1-15 the spacecraft as recited in claim 19, wherein the antenna elements [42] are symmetrically located within the antenna array [34].

Regarding claim 23, Rao et al. teaches in figures 1-15 the spacecraft as recited in claim 19, wherein the antenna elements [42] evenly spaced within the antenna array.

Regarding claim 24, Rao et al. teaches in figures 1-15 the spacecraft as recited in claim 19, wherein the antenna elements [42] are the same size.

Regarding claim 25, Rao et al. teaches in figures 1-15 the spacecraft as recited in claim 19, wherein the non-planar shaped antenna array surface [44] comprises a non-planar shape selected from the group consisting of a parabolic concave shape.

Regarding claim 26, Rao et al. teaches in figures 1-15 the spacecraft as recited in claim 19, wherein the antenna array [34] is a transmit antenna array, a receive antenna array, or a transmit and receive antenna array.

Regarding claim 27, Rao et al. teaches in figures 1-15 the spacecraft as recited in claim 19, wherein the antenna array [34] comprises M-number of antenna elements [42], and wherein the switching circuitry [36] is configured to control N-number of the M-number of antenna elements [42] at a given time, the switching circuit comprising: a signal splitter [48] adapted to split a signal into N-number of signals; a switching matrix [47] comprising NxM-number of switches [47]; and switch control circuitry

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adapted to control the switching matrix so that a specified set of the N-number of the M-number of antenna elements are switched on.

Regarding claim 28, Rao et al. teaches in figures 1-15 the spacecraft as recited in claim 27, wherein the switching matrix [47] comprises MEMS switches.

Regarding claim 29, Rao et al. teaches in figures 1-15 the spacecraft as recited in claim 27, wherein the switching circuit [36] further comprises a signal amplifier [49].

Regarding claim 30, Rao et al. teaches in figures 1-15 the spacecraft as recited in claim 27, wherein the switching circuit [36] further comprises a filter/diplexer [46] adapted to separate transmit and receive signals to/from the antenna array.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 14-18 and 31-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rao et al. (Cited above) in view of Chen et al. (U.S. Patent No. 6,404,404).

Rao et al. teaches every feature of the claimed invention in paragraph 5 except for the antenna array comprises a hexagonal array of antenna elements.

Chen et al. teaches in figures 3-4 the antenna array [60] comprises a hexagonal array of antenna elements [62].

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In view of the above statement, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the antenna elements as shown in Rao et al. by using the hexagonal array of antenna elements as taught by Chen et al. in order to reduce co-channel interference between adjacent cells (See Abstract).

Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shih-Chao Chen whose telephone number is (571) 272-1819. The examiner can normally be reached on Monday-Friday from 7 AM to 4:30 PM, First Fri. off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Don Wong can be reached on (571) 272-1834. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Shih-Chao Chen
Shih-Chao Chen
Primary Examiner
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December 29, 2004